

Notice of Allowability

Application No.

10/804,366

Examiner

Thanhha Pham

Applicant(s)

KIRBY ET AL

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 9/21/2007.
2. ☒ The allowed claim(s) is/are 10, 14-19, 21, 45, 53-55, 64, 66-67.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

THANHHA S. PHAM
PRIMARY EXAMINER



Allowable Subject Matter

1. Claims 10, 14-19, 21, 45, 53-55, 64 and 66-67 are allowed.
2. The following is an examiner's statement of reasons for allowance:
 - ▶ Recorded Prior Art fails to disclose or suggest the combination of the process steps of selectively etching silicon as recited in the base claim 10 including exposing a silicon layer on a semiconductor substrate to an etch solution consisting of tetramethylammonium hydroxide ("TMAH") and at least one organic solvent selected from the group consisting of isopropanol, butanol, hexanol, glycol, glycerol, propylene glycol, ethylene glycol, glycerin, and mixtures thereof; and removing the silicon layer without removing at least one of an exposed oxide layer, an exposed nitride layer, and an exposed polyimide layer also present on the semiconductor substrate.
 - ▶ Recorded Prior Art fails to disclose or suggest the combination of the process steps of removing a heated affected zone (HAZ) on a semiconductor substrate as recited in the base claim 18 including removing a HAZ on a silicon substrate without removing at least one of an exposed oxide layer and an exposed nitride layer present on the silicon substrate by exposing the silicon substrate to an etch solution comprising tetramethylammonium hydroxide ("TMAH") and at least one organic solvent selected from the group consisting of isopropanol, butanol, hexanol, phenol, glycol, glycerol, ethylene glycol, glycerin, and mixtures thereof; and smoothing at least a portion of the silicon substrate with a second etch solution comprising ammonium fluoride, phosphoric acid, water, hydrogen peroxide, and at least one organic.

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► Recorded Prior Art fails to disclose or suggest the combination of the process steps forming an aperture in a through-wafer interconnect as recited in the base claim 45 including exposing the silicon substrate to an etch solution comprising tetramethylammonium hydroxide ("TMAH") and at least one organic solvent selected from the group consisting of isopropanol, butanol, hexanol, phenol, glycol, glycerol, ethylene glycol, glycerin, and mixtures thereof; removing the HAZ without removing at least one of an exposed oxide layer, an exposed nitride layer, and an exposed polyimide layer present on the silicon substrate; and removing at least a portion of the silicon substrate with a second etch solution comprising ammonium fluoride, phosphoric acid, water, hydrogen peroxide, and at least one organic solvent.

► Recorded Prior Art fails to disclose or suggest the combination of the process steps forming a through-wafer interconnect as recited in the base claim 55 including removing the HAZ without removing at least one of an exposed oxide layer and an exposed nitride layer present on the silicon substrate by exposing the silicon substrate to a first etch solution comprising tetramethylammonium hydroxide ("TMAH") and at least one organic solvent selected from the group consisting of isopropanol, butanol, hexanol, phenol, glycol, glycerol, ethylene glycol, glycerin, and mixtures thereof; and removing at least a portion of the silicon substrate with a second etch solution comprising ammonium fluoride, phosphoric acid, water, hydrogen peroxide, and at least one organic solvent.

3. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

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accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TSP



THANHHA S. PHAM
PRIMARY EXAMINER